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REMARKS

The Office Action of January 10, 2008 (Paper No. 20080104) has been carefully considered.

Claims 22-24 are being amended, and claims 25-27 are being added. Thus, claims 8-27 are pending in the application.

On page 2 of the Office Action, the Examiner objected to Figures 2-8 for failure to present the drawing in the same orientation as the drawing label. Corrected Figures 2-8 are being submitted herewith so that the drawings now have the same orientation as their labels. Thus, the objection should no longer apply.

On pages 3 and 4 of the Office Action, the Examiner rejected claims 8 and 22 under 35 U.S.C. 102 for alleged anticipation by any one of the following references: Mandt, U.S. Patent No. 6, 190,554; Mandt, U.S. Patent No. 6,398,957; European document EP1099668; and German document DE19816076A1. On page 4 of the Office Action, the Examiner rejected claims 9-21, 23 and 24 for alleged obviousness under 35 U.S.C. 103. For the reasons stated below, it is respectfully submitted that the invention as recited in independent claim 1 and in amended independent claim 22 is distinguishable from the cited art so as to preclude rejection under 35 U.S.C. 102 or 35 U.S.C. 103.

Specifically, none of the references cited in the Office Action discloses or suggests the U-shaped pipe-piece having the characteristics and functions as recited in independent claim 8 and discussed below, and none of the references cited in the Office Action discloses or suggests the use of such a U-shaped pipe-piece to achieve the steps of the inventive method recited in amended independent method claim 22.

In general, it must be pointed out that the invention is not without precedent with respect to the fact that, as biological sewage purification equipment, it uses two intermittent-running tanks connected to each other with some sort of hydraulic connection, the first tank being smaller and not aerated, while the second one is larger and aerated. However, the invention is significantly different from known arrangements with respect to the claimed arrangement and method of hydraulically connecting the tanks. The novel technical features can be summarized as follows.

(1) The connection between the two tanks consists of two independent structural units. The first one is the U-shaped pipe-piece 15 (see Figure 3) consisting of one arm 16a and another arm 16b, and constructed as a communicating vessel set to a minimal fluid level between the two tank parts, the main reactor I and the anterior reactor II.

(2) The second unit is a transfer opening 8 constructed in partition wall 12 situated between the main reactor I and the anterior reactor II, and which, in the given section of the purification plan, is situated below the maximum fluid level, but above the minimum fluid level.

Due to these special hydraulic connections placed at the appropriate height, the reactor surfaces of the main reactor I and anterior reactor II can be used as a whole and completely for sedimentation and for removing cleaned water. As a result, the hydraulic capacity increases by at least 30% as contrasted with the equipment described in the prior art documents referred to in the Office Action.

Another important distinction between the invention and prior art is that, in the invention, the method of receiving sewage is different between the equipment and the receiving structure, and the method of discharging treated sewage is also different between the equipment and the outlet point.

Due to the above significant differences between the hydraulic connections of the present invention and those of the prior art, it is possible to realize new methods of operation, that is, to realize a new procedure having significant advantages over previous known methods and techniques.

Mandt, U.S. Patent No. 6,190,554

In Mandt '554, due to the method of realizing ordinary hydraulic connection between the two tanks, sewage can only be decanted from the aerated space, which results in unnecessary and wasteful shrinking of the sedimentation surface and the expenditure of an exorbitant amount of sedimentation and water-discharge time.

In contrast, in the invention, one single main reactor is connected to each anterior reactor. Due to the specific hydraulic connection described above, that is, due to the hydraulic connection situated at an appropriate height between the two tank-parts (U-shaped pipe-piece 15 and transfer opening 8), the invention is able to use the complete reactor surface for sedimentation and for cleaned water discharge since, in the invention, the upper surface parts of the main reactor I and the anterior reactor II are connected to each other. As a result, in the course of decanting, cleaned sewage can be obtained from both tank-parts while, in the course of aeration, the water mixed with oxygen is also circulated between both spaces.

According to the procedure described in Mandt '554, crude sewage is deposited into the anoxic tank continuously. However, in the invention, crude sewage is received in a timed manner through the equalizing tank. The advantage of the latter solution provided by the invention is that nitrogen removal can be dimensioned and controlled. As a result, the hydraulic connection between the equipment and the anterior facilities determines the quality of the operation.

Mandt, U.S. Patent No. 6,398,957

In the purification plant according to Mandt '957, and in contrast to the invention, there is a separate anaerobic zone, that is, anaerobic conditions are realized in space rather than in time. In an anaerobic reactor according to the Mandt '957 patent, an explicit excess sludge fermentation process is carried out so that, practically speaking, as disclosed in Mandt '957, there is no biological phosphor removal because of phosphor re-dissolving from the fermenting sludge. However, in contrast, in the present invention, in a given phase of the procedure, the anaerobic zone is created in the smaller reactor part enabling biological phosphor removal via the accumulation of phosphor in the sludge while, on the other hand, it becomes possible to insert an excess sludge treatment method, which keeps phosphor bound in the sludge.

Due to the method of hydraulic connection between the two tanks the above equipment of Mandt '957 is able to decant cleaned sewage only from the aerated space, which in this case again results in the unnecessary and wasteful shrinking of the sedimentation surface and the extension of sedimentation and water discharge time.

In contrast, in accordance with the invention, as described above, one is able to use all reactor surfaces for sedimentation and for the discharge of cleaned water due to the special hydraulic connection placed at the appropriate height between the two reactor parts, as a result of which the hydraulic capacity increases by at least 30% as compared to the equipment disclosed in Mandt '957..

German Document DE19816076A1

The invention is distinguishable from the '076 reference on several bases.

First, in the '076 reference, the anterior reactor is not a mixed, explicitly pre-decanting unit, and it is not a reactor dimensioned and optimized for the removal of

biological nutrient elements (N-, P-). In contrast, in the claimed invention, the anterior reactor is a reactor-part optimized for the removal of biological nutrient elements (N-, P-).

Second, in the '076 reference, of the two passages between the two tanks, one is always closed and the other is periodically closed during decanting. In contrast, in the claimed invention, during decanting, one tank is always above water level so that it is not in operation, while the other tank is always open and passable.

Third, in the '076 reference, sewage input into the biological reactor takes place from the anterior reactor after sludge recirculation, while in the claimed invention, the two processes take place at the same time as a consequence of the special hydraulic connection.

Fourth, in the '076 reference, the first hydraulic connection may be closed with an automatic fitting, a lock valve. In contrast, in the claimed invention, neither hydraulic connection can be closed, and when the water level is low, as it gets above the current operating water level, it does not operate.

Fifth, in the '076 reference, recirculation from the biological reactor, and the feed of now diluted sewage to it from the anterior reactor, take place before aeration. However, in the invention, these processes take place at the same time.

As a result of the above characteristics of the invention, which result from the unique hydraulic connections of the invention, the invention achieves a timed, predictable and more effective sewage treatment process.

European Document EP 1.099.668 A1

In the '668 document, mixing for the purpose of denitrification may exist in the main reactor. In contrast, according to the present invention, the mixing takes place in a separate compartment, as already mentioned above.

In the biological reactor of the '668 document, the water level does not change or only changes slightly as the input wastewater pushes out the cleaned sewage so that water input and the clean water discharge take place at the same time. For this, at least two parallel biological reactors are needed. Furthermore, according to the procedure appearing in the '668 document, recirculation is a separate phase of the cycle. In contrast, according to the present invention, recirculation takes place at the same time as aeration.

Furthermore, in the present invention, the biological reactors have a water level that changes according to a strict timing, and they receive the sewage in accordance with this timing from a separate equalizing tank for the purpose of optimizing the biochemical processes. Charging always follows only after the cleaned water has been discharged. The number of treatment series is optional, and can even be just one.

In the '668 reference, of the two passages between the two tanks, the continuously passable one is at the bottom of the tanks, while in the invention, the hydraulic connection is located at the minimum water level, which results in the two tanks behaving as a communicating vessel during decanting without the settled sludge being mixed up.

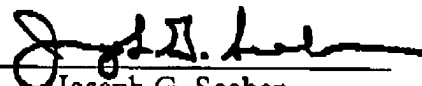
To summarize, as a result of the above differences between the invention and the disclosures of the cited references, the present invention is distinguishable from the cited prior art so as to preclude rejection under 35 U.S.C. 102 or 35 U.S.C. 103.

No fee is incurred by this Amendment. However, a Petition for Extension of Time (one-month) and a Deposit Account authorization are being filed herewith.

Respectfully submitted,

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